

REMARKS

Claims 1-2 and 4-18 are pending in the application. Claims 8-10 are withdrawn as directed to a non-elected invention. By this Amendment, Claims 1, 4 and 11 are amended, Claim 3 is canceled, and new claims 12-18 are added.

In the Office Action, the Examiner rejects Claim 1 under 35 U.S.C. §102(b) over an article entitled "Development and Fabrication of a Bi-2223 Racetrack Coil for Generator Applications", authored by Kenneth G. Herd, *et al.* (Herd). The Examiner also rejects Claims 2-7 and 11 under 35 U.S.C. §103(a) over Herd in view of Applicants' Admitted Prior Art (AAPA). The Examiner also rejects Claims 3-5 under 35 U.S.C. §103(a) over the Herd reference in view of U.S. Patent No. 3,710,293 to Lazor (Lazor). These rejections are respectfully traversed.

In the *Response to Arguments* section on page 7 of the Office Action, the Examiner asserts that Herd at page 531, lines 15-19 and at Tables 3-4, discloses a *high-voltage* insulation system as recited in Claim 1 of the present application. Specifically, the Examiner asserts that Tables 3-4 show measurement results of terminal voltages, ampere-turns, and coil heating for currents up to 15 amperes and for 20K, respectively.

These assertions are respectfully traversed.

Applicants first note that the cited sections of Herd fail to disclose or suggest a *high-voltage* system because the "100MVA" mentioned on line 21 at page 531 of Herd refers to the *generator as a whole*, which includes hundreds of coils of the type discussed in Herd. Hence, the maximum voltage mentioned in the tables of the Herd reference, *i.e.*, 10 V, when divided by the number of layers (which is 51, as disclosed on page 531 at line

29) and divided by an average thickness of the insulating paper wrap (0.1 mm), yields an electric field of a few V/cm, which is 4 orders of magnitude lower than the breakdown fields at which the present invention is capable of operating. See, for example, the present application at page 6, line 22. Furthermore, coils intended for producing magnetic fields, such as the coils disclosed in Herd, were never intended to be exposed to higher voltages during normal operation, and are not designed to withstand higher voltages that would be found in a power transformer where the entire voltage of the high-voltage transmission line drops over the windings of the primary/secondary side.

Accordingly, Herd fails to disclose or suggest the claimed invention, in particular as recited in Claims 17-18. Herd likewise fails to disclose or suggest Claim 1 and new Claim 12 for at least the following four reasons:

1) Herd discloses a coil including a copper heat exchanger wrapped around an outer surface of the coil and an impregnated fiberglass cloth, see for example page 531. In other words, Herd discloses a highly robust potted coil structure. Accordingly, Herd fails to disclose or suggest a need to provide additional mechanical stability, and therefore fails to disclose or suggest a high-voltage insulation system comprising a solid material having a cured polymer matrix and a base fabric comprising *cellulose in the form of pressboards*, as recited in Claim 1, and similar features in Claim 11.

2) Herd's paper insulation is *wrapped* around the tape, prior to winding of the tape, and has a cross section of few square millimeters since the width of the tape is less than 0.5 centimeters and the coil height of 10 centimeters is divided by 23 turns per layer. Herd

teaches away from pressboard, because it is not possible to wrap pressboard around Herd's tape.


3) Herd discloses that one of the paper wrap's functions is to wick epoxy resin throughout the coil during the impregnation process. See for example Herd at page 532, right column. However, pressboard does not appear to have this same property or capacity for wicking epoxy resin. Accordingly, Herd teaches away from using pressboard.

4) Herd fails to disclose or suggest using a thicker insulation such as pressboard, because Herd's voltage drop between successive layers is only 0.2 Volts, as described above.

For at least the above reasons, Herd fails to disclose or suggest all of the features recited in Claims 1 and 12. In addition, Applicants respectfully submit that AAPA and Lazor fail to overcome the deficiencies of Herd set forth above. Withdrawal of the various rejections under 35 U.S.C. § 102(b) and 35 U.S.C. § 103(a) over Herd, AAPA and Lazor is respectfully requested.

Applicants respectfully submit that the application is in condition for allowance. In the event any questions arise regarding this communication or the application in general, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below.

Respectfully submitted,
BURNS, DOANE, SWECKER & MATHIS, L.L.P.

By: 
M. David Ream
Registration No. 35,333

P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620

Date: 31 December 2003